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ABSTRACT

Many academic institutions are moving toward data base management and information retrieval system software to process regularly scheduled reports of information from large, multifaceted, student and faculty data bases. While customized reporting is typically available, oftentimes, personnel that produce reports operate in an overload status and such requests take hours or, in some cases, days to process. Lacking on most campuses is the ability for faculty and administrative personnel to directly access such data, retrieve information in a user-friendly, highly informative manner, as well as generate their own customized reports, charts, plots, etc. This paper presents paper presents a "point-and-click" graphical user interface (GUI) capability for monitoring and assessing information from student, faculty, and related data that puts control in the hands of the user (faculty, administrative personnel, etc.). This capability utilizes the object oriented programming (OOP) capabilities of the Statistical Analysis System (SAS) package and permits the retrieval and reporting of strategic information in real-time. Specific enhancement of the ability for faculty and administrative personnel to perform student advising, diagnostic assessments, and standard information retrieval will be demonstrated. Emphasis is given to monitoring and assessing information from a multiyear data base comprised of students from Sam Houston State University (Huntsville, Texas) who are preparing for careers as teachers. (Author)

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A GRAPHICAL USER INTERFACE (GUI) FOR MONITORING AND ASSESSING THE EFFECTIVENESS OF FACTORS ASSOCIATED WITH ExCET PERFORMANCE

Presented

at the

National Association for Teacher Education Conference
Dallas, Texas

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February 16, 1998

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A Graphical User Interface (GUI) for Monitoring and Assessing the Effectiveness of Factors Associated with ExCET Performance

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1.0 ABSTRACT

Many academic institutions are moving toward data base management and information retrieval system software to process regularly scheduled reports of information from large, multifaceted, student and faculty data bases. While customized reporting is typically available, oftentimes, personnel that produce reports operate in an overload status and such requests take hours or, in some cases, days to process. Lacking on most campuses is the ability for faculty and administrative personnel to directly access such data, retrieve information in a user-friendly, highly informative manner, as well as generate their own customized reports, charts, plots, etc. This paper presents a "point-and-click" graphical user interface (GUI) capability for monitoring and assessing information from student, faculty and related data that puts control in the hands of the user (faculty, administrative personnel, etc.). This capability utilizes the object oriented programming (OOP) capabilities of the Statistical Analysis System (SAS) package and permits the retrieval and reporting of strategic information in real-time. Specific enhancement of the ability for faculty and administrative personnel to perform student advising, diagnostic assessments, and standard information retrieval will be demonstrated. Emphasis is given to monitoring and assessing information from a multiyear data base comprised of students from Sam Houston State University (Huntsville, Texas) who are preparing for careers as teachers.

2.0 SYSTEM CHARACTERISTICS

The system is a GUI that maximizes reliance on a "point-and-click" environment with the overall system possessing the following key characteristics:

- **Emphasis is on "ease of access" for administration and faculty**
- **Summary diagnostic information is provided about students collectively at each level of the various demographic variables**
- **Individual student information is available through profile charts and tables**
- **Campus-wide accessibility is achieved while maintaining data base security**
- **Icons and objects are configured and labeled in an attempt to be self-explanatory**
- **"Help" buttons are available throughout for user clarification of the purpose and operation of each screen**

System implementation of this capability can be carried out on individual machines, on a campus-wide networked system or as a part of any other configuration on which the SAS package resides. Data warehousing is a key part of the front-end, preprocessing part of this package. In particular, upon arrival of new data, a preprocessing program carries out an extensive data preparedness step that is directly oriented toward making all aspects of the package perform optimally in terms of "real-time" data accessing and "data mining". Data mining here refers to those items in the package that permit strategic information retrieval and assessment; it includes the special ways and means of using charting, report writing, plotting, and other statistical tools for assessing the key information content of the data.

3.0 DATA BASE CHARACTERISTICS

The system discussed herein manipulates the university student database referred to as the ExCET data. ExCET refers to a set of "exit" exams taken by students who have chosen the teaching profession and who have completed their standard coursework and other degree requirements. ExCET stands for "Exams for Certification of Elementary Teachers" and success on these exams is also a requirement for graduation. Moreover, state resources that support such programs is contingent upon students' passing rates. Consequently, the need exists to have extensive insight into such data with information assessment capabilities as mentioned in Section 2.0.

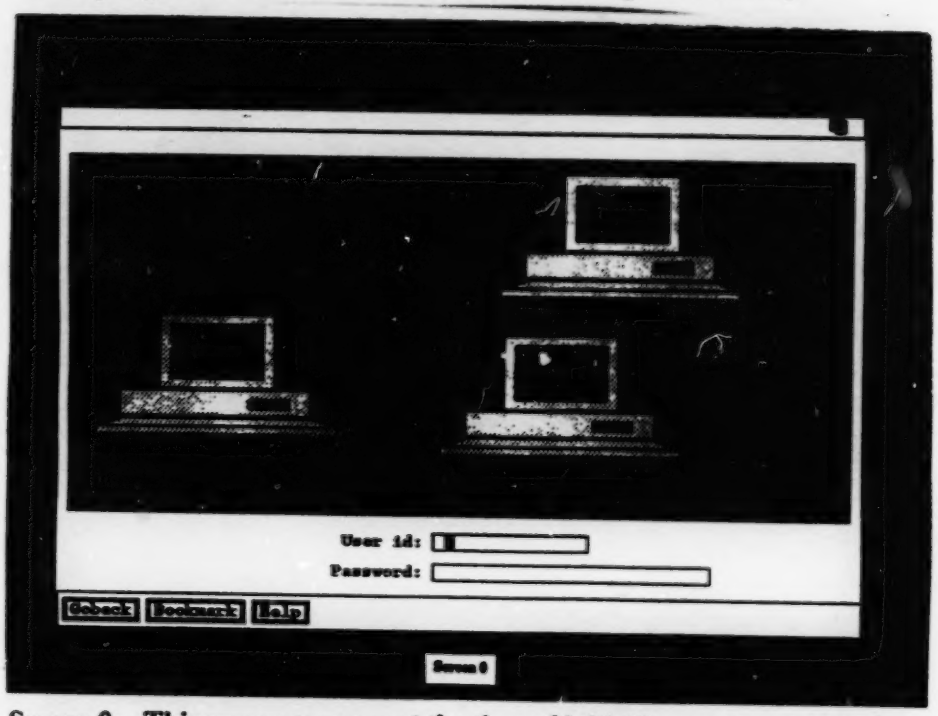
The ExCET data base is comprised of numerous variables including: student name, social security number, gender, ethnic background, birth date, SAT scores, ACT scores, TASP scores, transfer grade point averages, department, major, high school code, county residence, state residence, and numerous other variables. The data warehousing part of this structure specifically supports minimization of data

storage, user response time, while maximizing the degree of flexibility for performing the data mining. To accomplish this, special summarized data subsets (e.g., at the college and departmental levels) are generated that permit diagnostic and critical, summary insight into students' collective performances on ExCET tests at the college, departmental, major and minor levels. Geographic information is incorporated in as well through the use of the Geographic Information System (GIS) module that is a part of the overall SAS package.

A decade of our data currently comprises less than 100 megabytes of storage; running the preprocessing source code results in the overall raw data set being subdivided into 4 university-level summarized data sets (one for each college on campus), followed by a further subdivision down to the departmental level. These data are further reduced in size by performing summaries of student performances on ExCET tests as well as summaries on SAT, ACT, and TASP tests. These are especially useful for diagnostic assessments of where students are lacking in terms of preparedness. The next section provides a look at several GUI screens that are a part of the overall ExCET Processing System. Further insight or answers to questions are available from contact with any of the papers' authors.

4.0 A SAMPLE OF SCREENS

A sampling of screens is discussed for further insight and clarity.



Screen 0: This screen appears at the time of initial logon; it provides the security that is mandatory for access to ExCET data.

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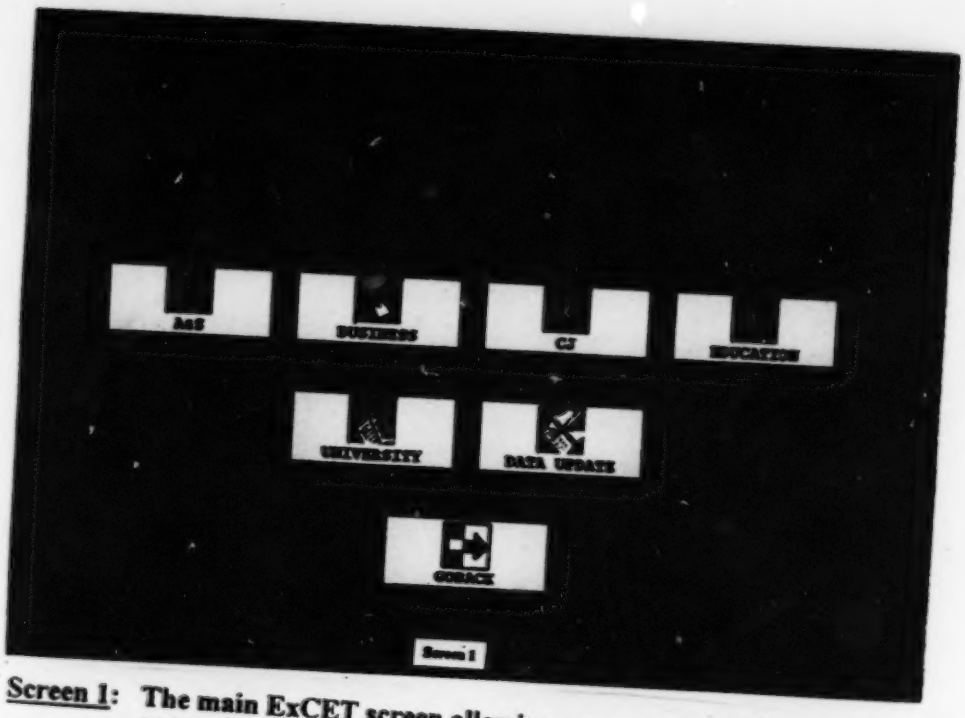
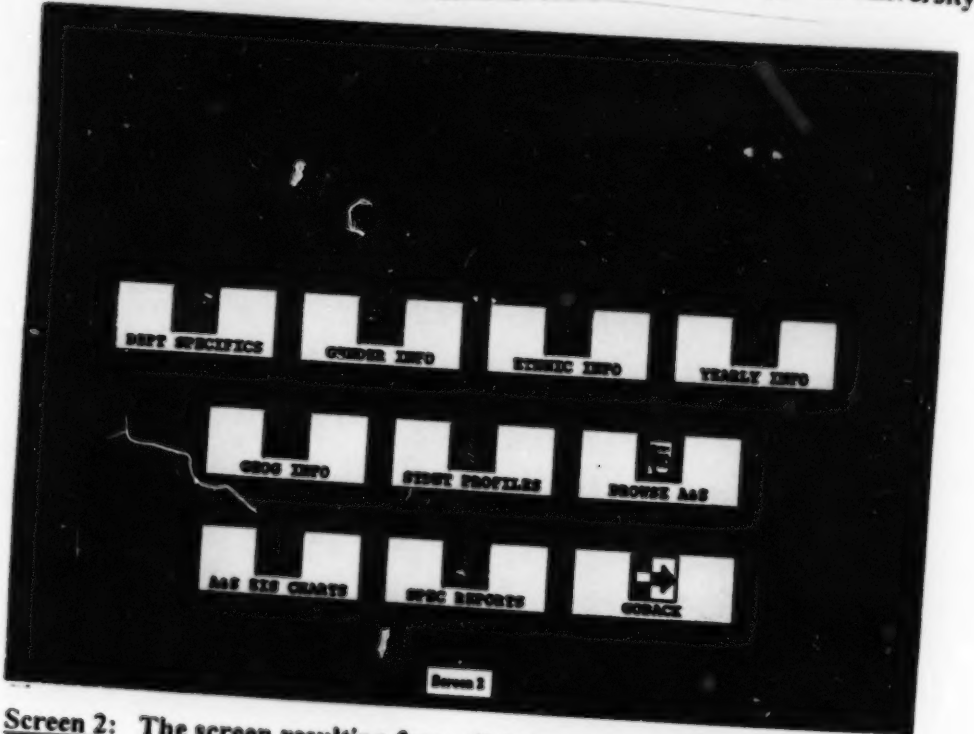


Screen 1: **The main ExCET screen allowing access to college and university level information.**



Screen 2: **The screen resulting from clicking on the A&S icon on screen 1.**

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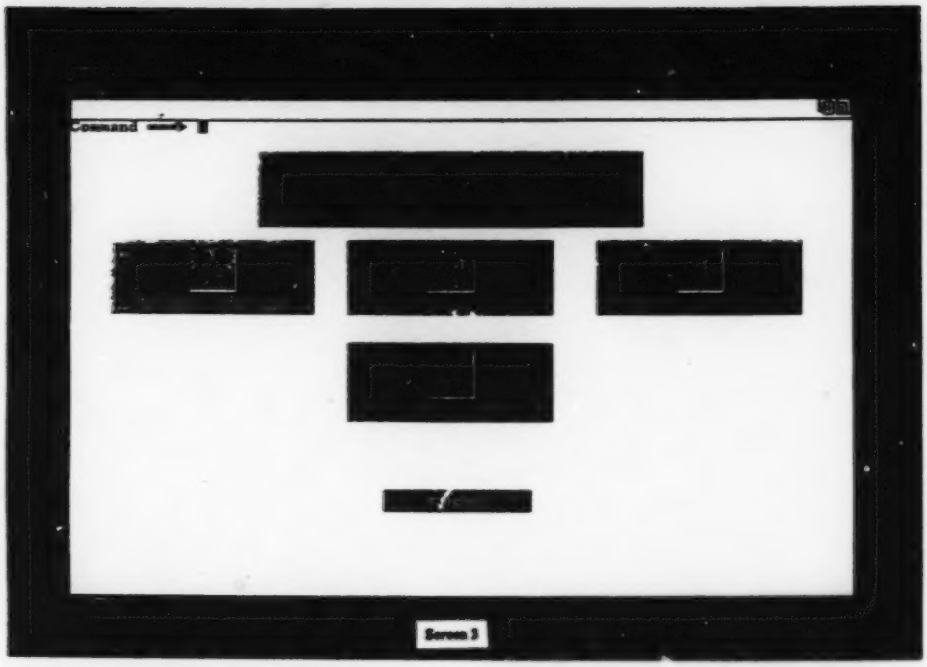
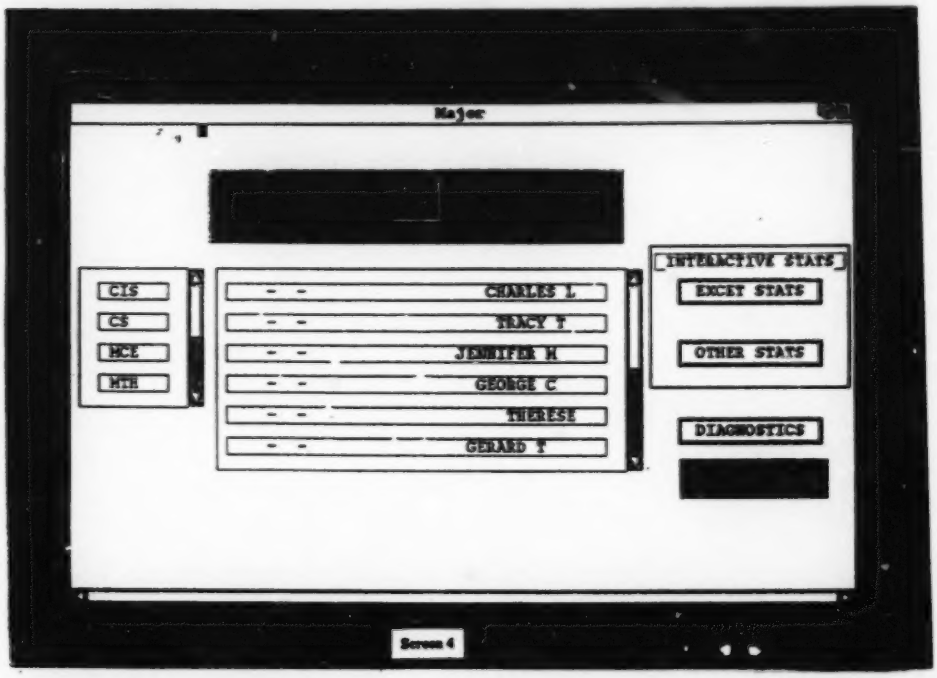


Screen 3: This screen results from clicking on the DEPT SPECIFICS icon, resulting in a drop-down popmenu that lists all the Departments in A&S, and then clicking on the Dept. of Mathematical and Information Sciences.



Screen 4: The screen resulting from clicking on the STUDENT PROFILES icon on screen 3.

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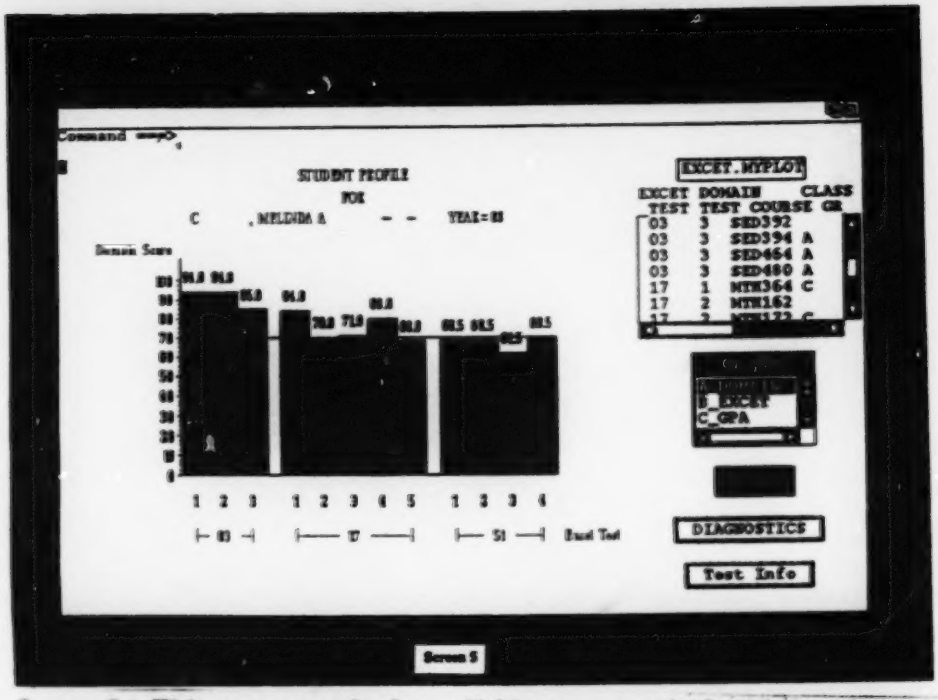
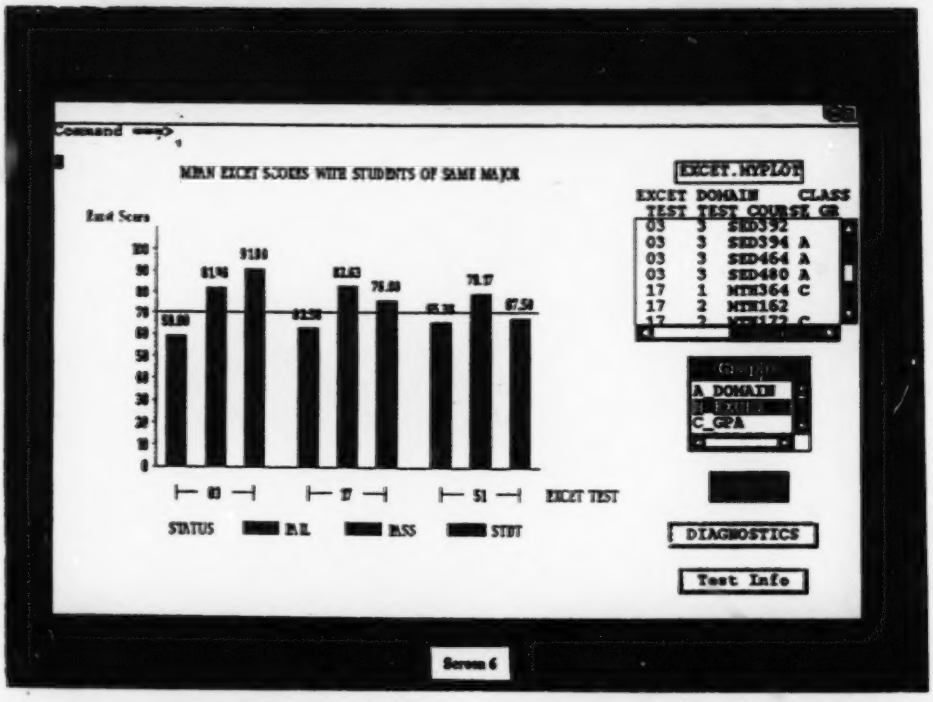


Screen 5: **This screen results from clicking on a particular student from the listbox on screen 4. What you see is the charting of all domain test grades associated with each ExCET test taken by the selected student.**



Screen 6: **This screen is the same as screen 5 except the plot is now that for the ExCET scores achieved by the selected student (note that this was easily done by merely clicking on ExCET in the listbox to the right).**

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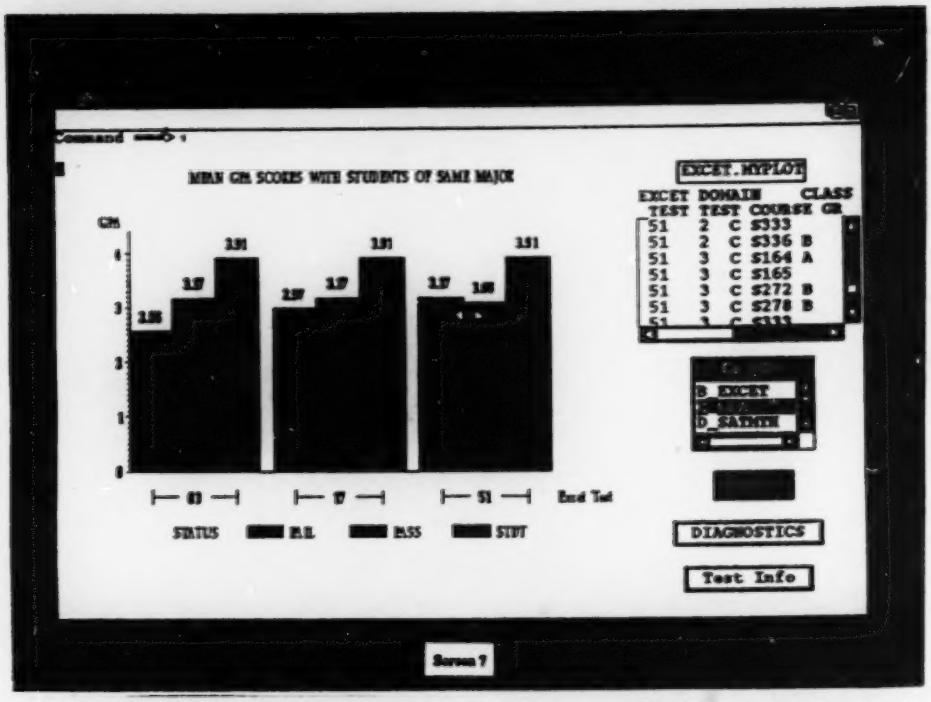
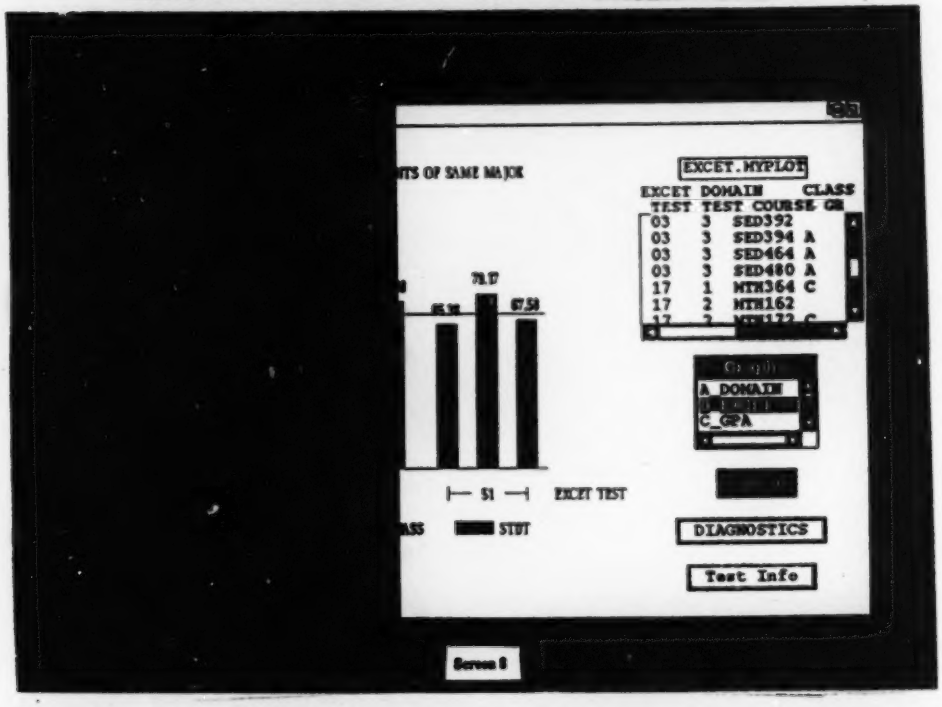


Screen 7: **This screen is the result of clicking on GPA in the listbox to the right in screen 5; it has the same explanation as given in screen 6 except the displayed information is that of the GPA.**



Screen 8: **By clicking on the icon entitled "Test Info", a screen pops up that has an abbreviated title for each of the ExCET tests for quick reference. This same information can be accessed on any screen by indexing the F12 function key.**

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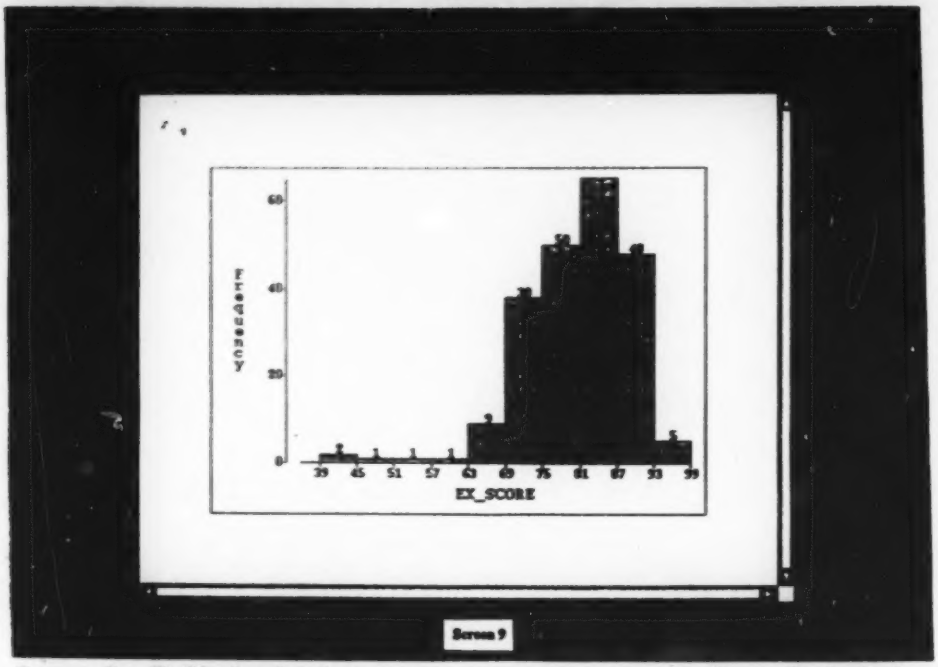
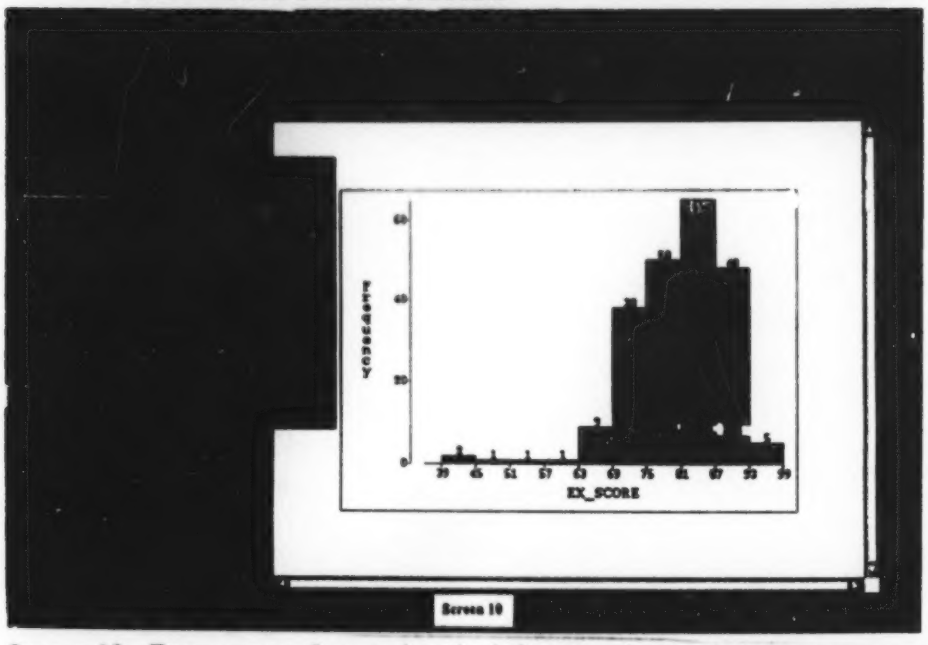


Screen 9: **Referring back to screen 4, this screen results from the indexing of the ExCET STATS icon in the INTERACTIVE STATS block. It immediately displays the distribution of ExCET scores for the Math and Information Sciences students.**



Screen 10: **From screen 9, pressing the left mouse button brings up a popmenu with a number of choices; by selecting the word WINDOWS followed by ANIMATE, screen 10 results. The key categorical variables in the ExCET data base now appear in the smaller screen to the left. By clicking on one of these, all its values appear immediately to the right under the "Value:" heading. By clicking on one of these, the distribution immediately reflects its contribution to the overall distribution as indicated.**

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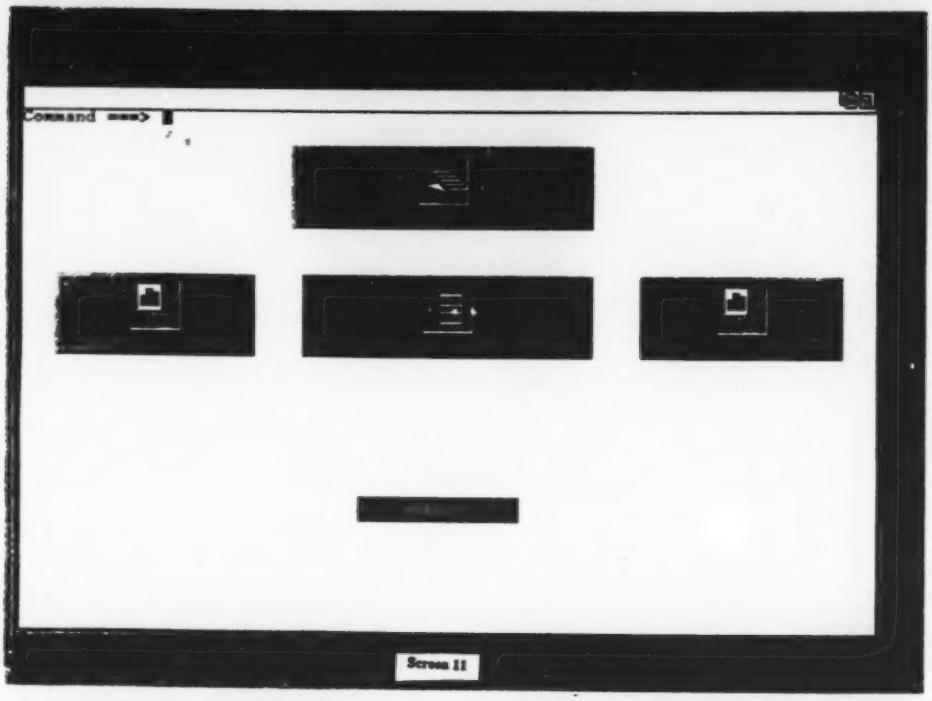
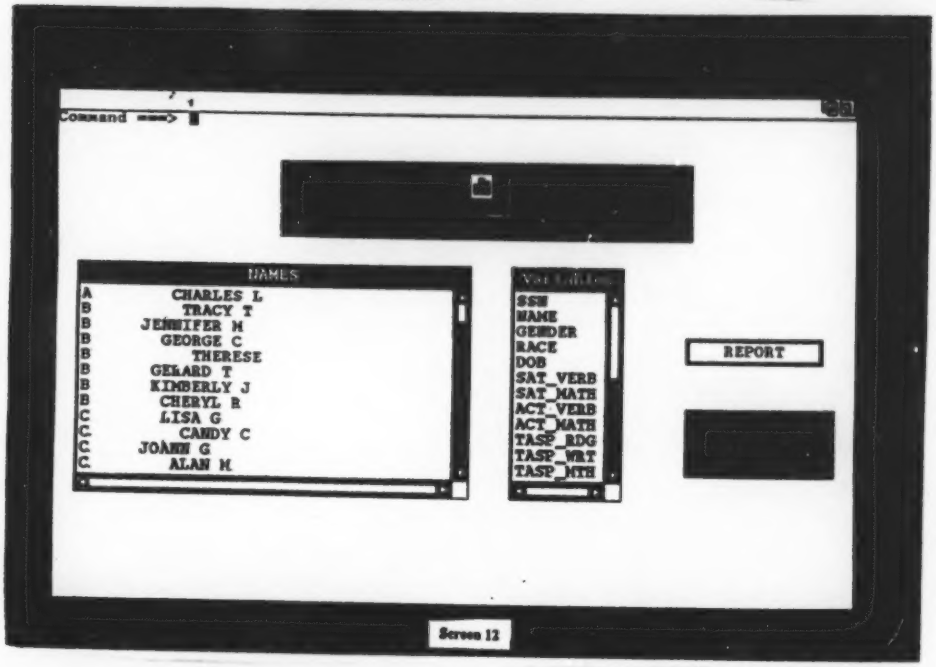


Screen 11

Screen 11: Referring back to screen 3, this screen results from clicking on the STUDENT REPORTS icon. It allows for several choices of reports (to be discussed at presentation time).



Screen 12

Screen 12: This screen allows for a quick printout to the printer of any student (clicked on in the first listbox) and any subset of variables in the data base (clicked on in the second listbox – note that any subset of the total list of variables may be selected for inclusion in the printout).

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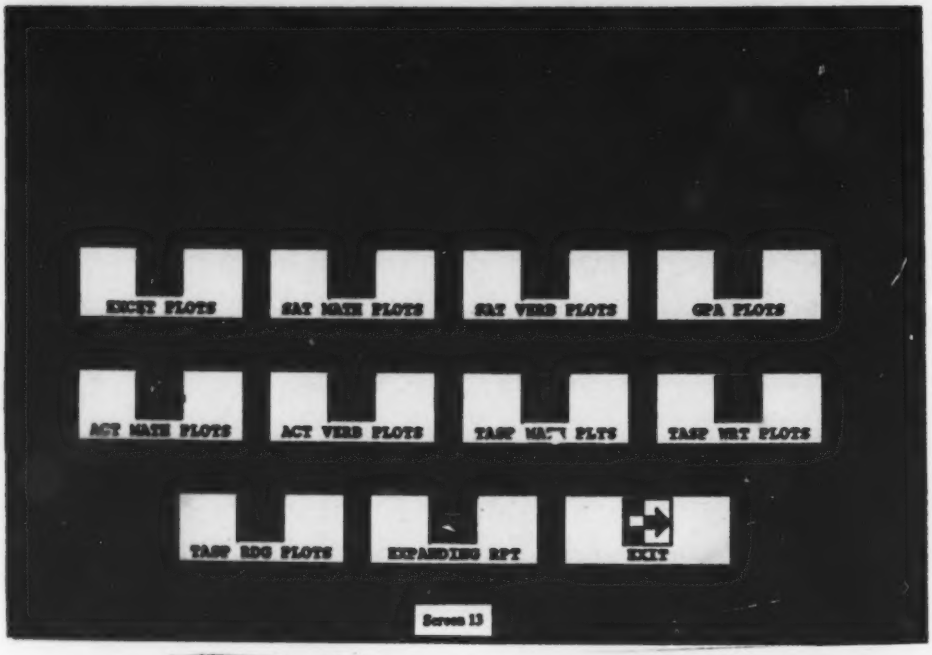
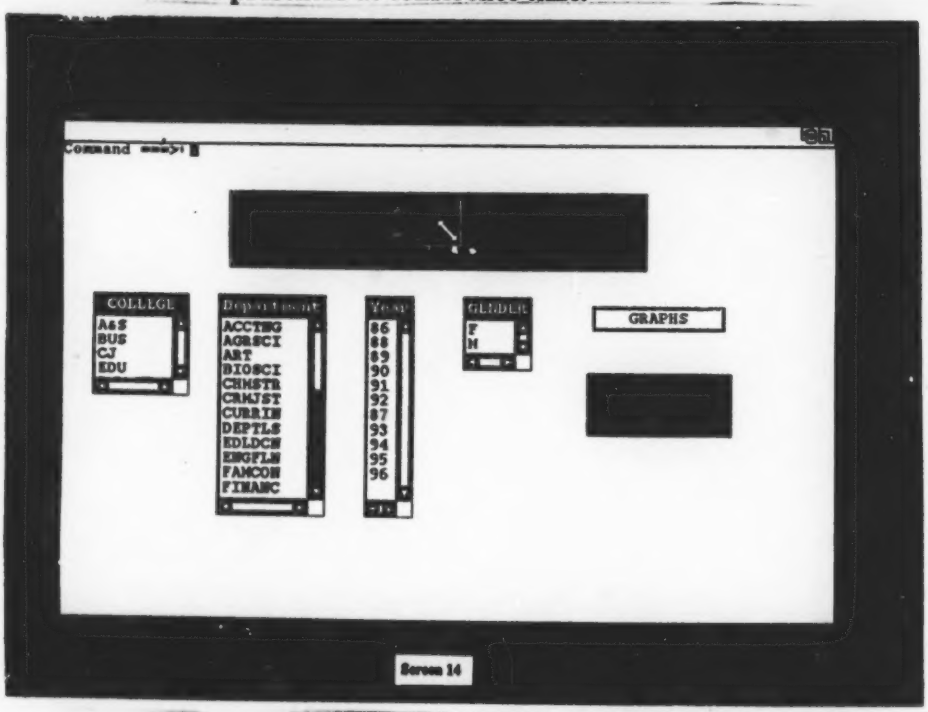


Screen 13: Referring back to screen 2 (the main A&S screen), this screen results from indexing the ETHNIC INFO icon. It permits the choice of plots pertaining to the key analysis variables in the ExCET data base. These will be presented at conference time.



Screen 14: This screen results from indexing the UNIVERSITY icon on screen 1 followed by the indexing of the GENDER INFO icon that comes up with several others on that follow-up screen.

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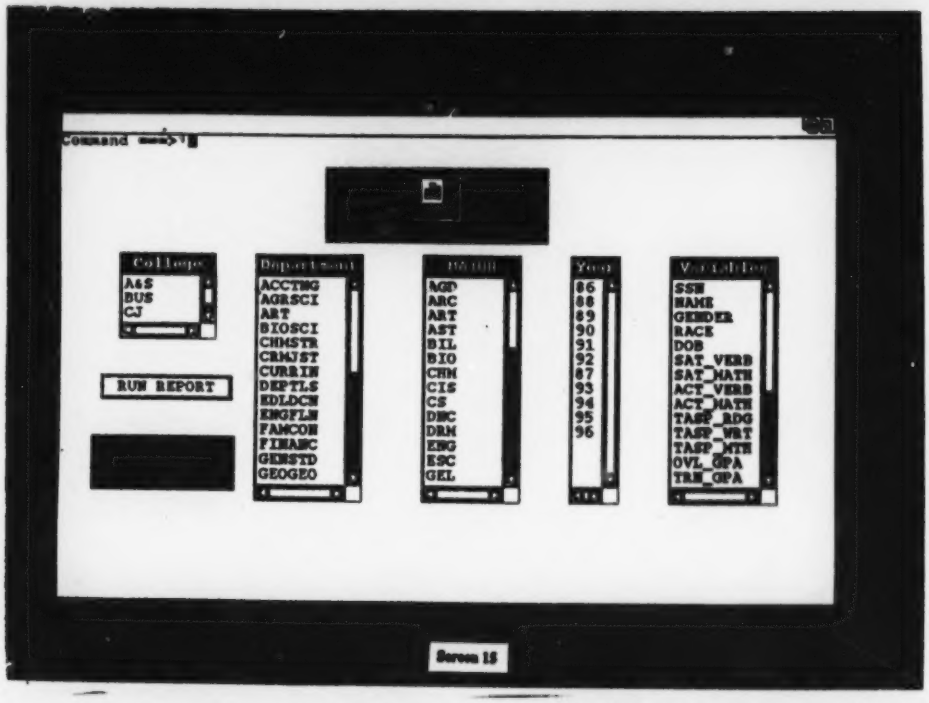
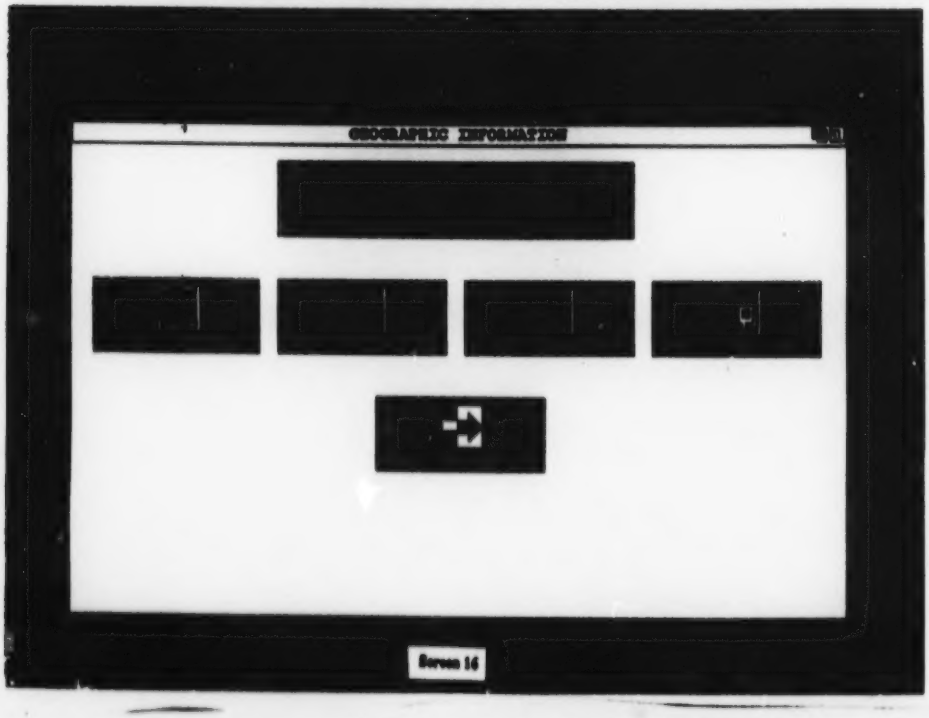


Screen 15: This screen results from the UNIVERSITY icon on screen 1 followed by indexing the UNIV REPORTS icon on the resulting screen. It allows for considerable flexibility for getting hardcopy reports of any subset of campus-wide information.



Screen 16: This screen results from indexing the GEOG INFO icon on screen 2. By indexing the TEXAS GIS INFO icon, screen 17 appears.

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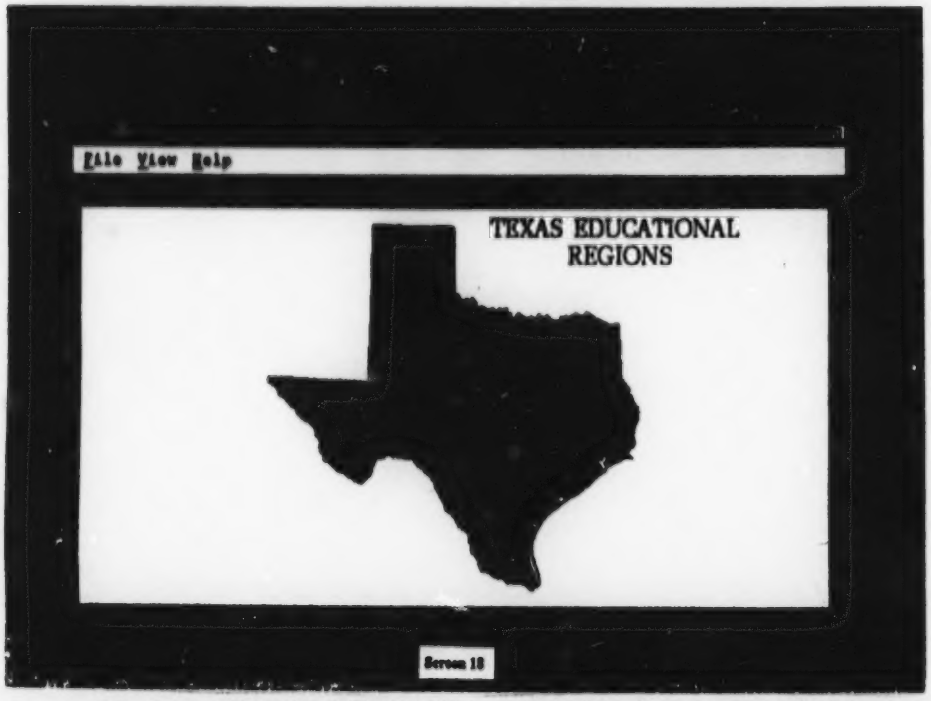
Screen 17: This screen results from screen 16 and permits the indexing of any county in Texas at which time a popmenu results and allows for numerous choices for information related to students from the selected county.



Screen 18: If the TEXAS REGIONS icon is indexed on screen 16, this screen results and allows considerable point-and-click information related to the 20 separate regions throughout the state.

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5.0 SUMMARY

This paper summarizes a "point-and-click" capability that affords the opportunity to attain considerable insight into large student databases such as the ExCET data in the case discussed herein. The sample of screens and associated discussion, hopefully, effectively presents various notions of the approach taken by our campus in accomplishing this goal. The expanse of information that can be attain is quite far-reaching and the contents herein comprise a little "flavor" of how this may be done using a package like SAS (Statistical Analysis System). It has been our experience that colleges and universities are especially in need of much more user-friendly tools for assessing student information. Such a capability has been implemented at our university and we feel confident that it is a gigantic leap in the right direction.